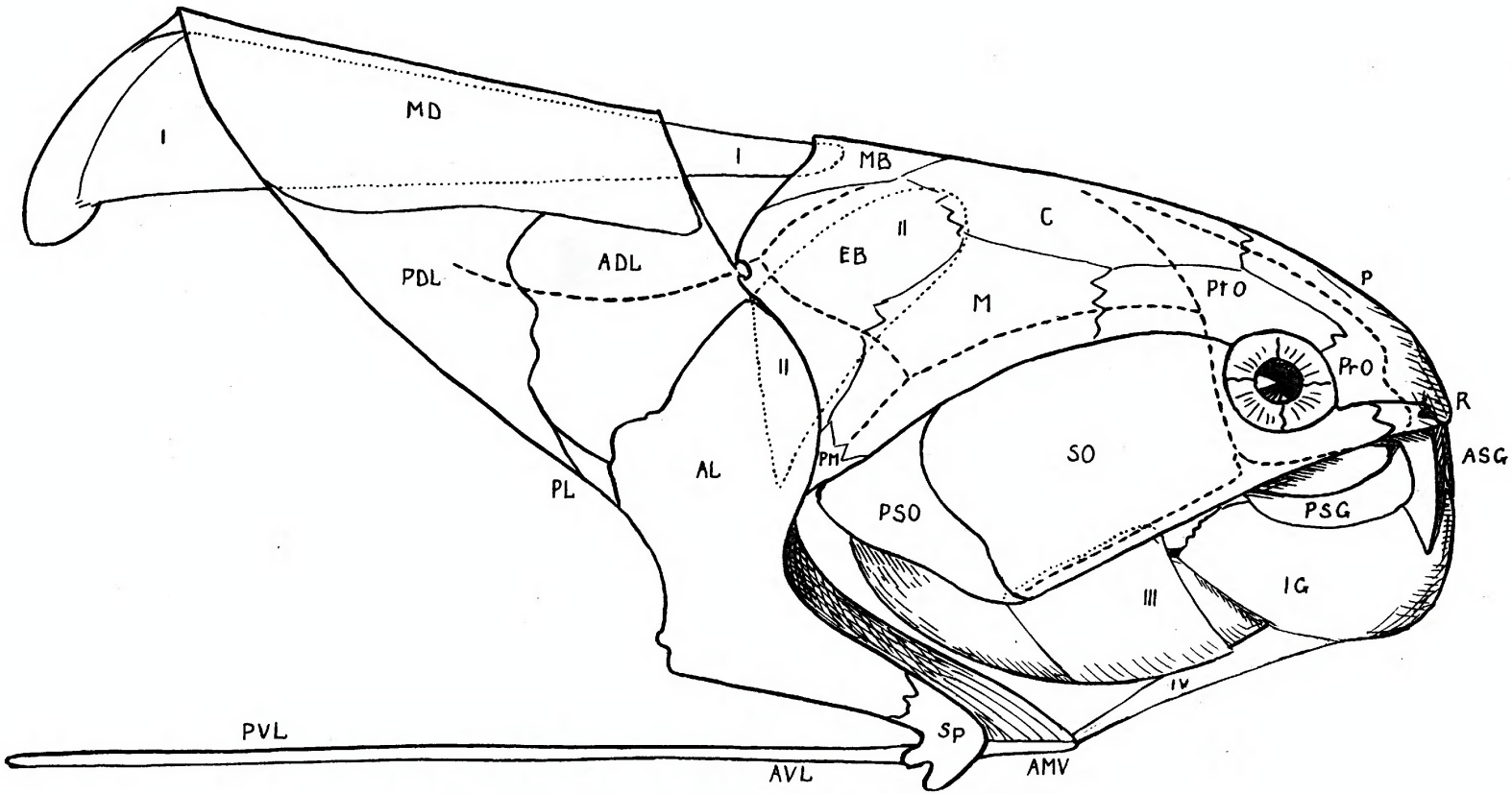

Fig. 1. Reconstuction of *Dinichthys* armor. Mouth closed.

I. Musculus levator capitis.
II. Musculus depressor capitis.
III. Musculus levator gnathalis.
IV. Musculus depressor gnathalis.

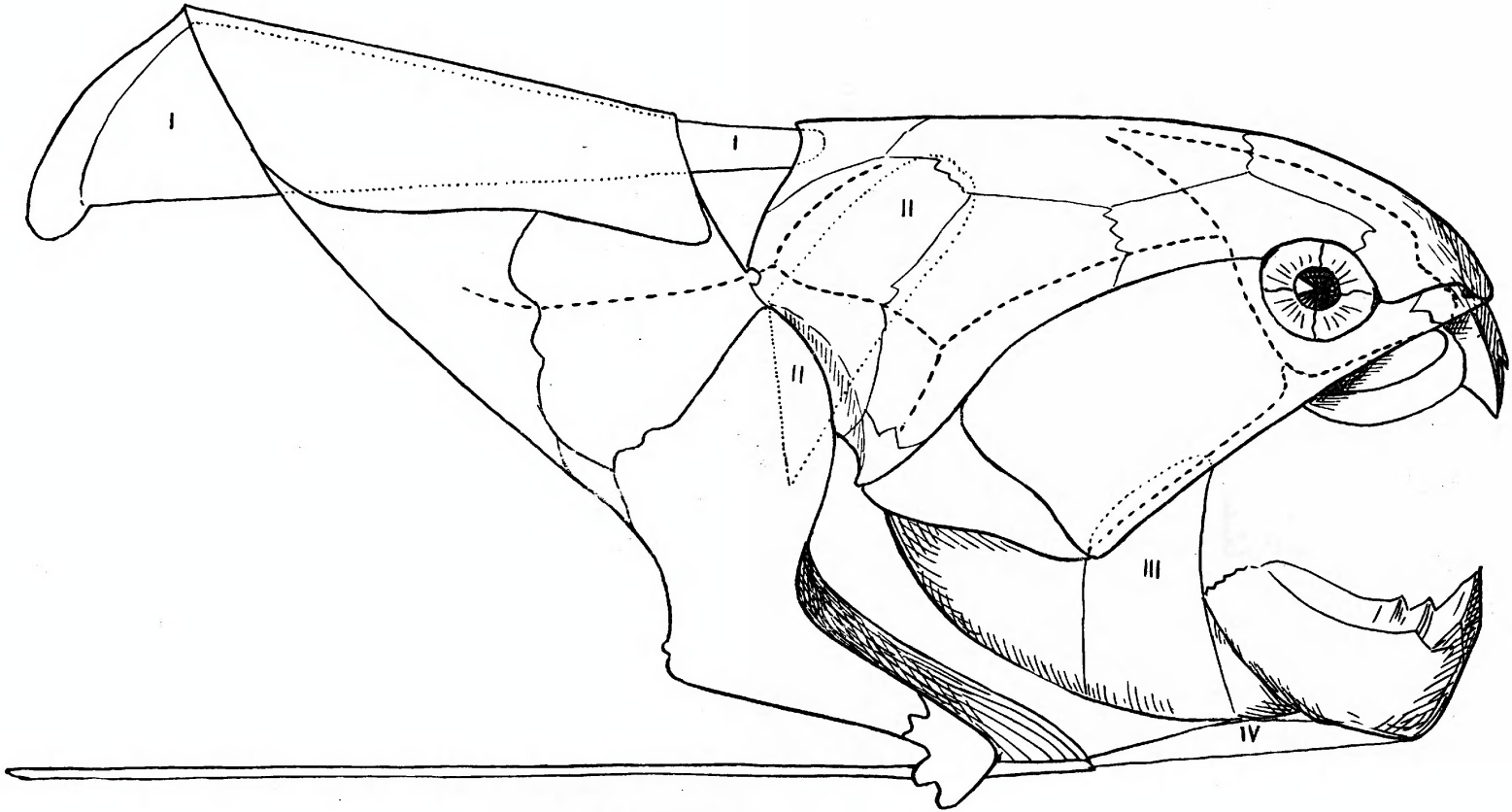

Fig. 2. *Dinichthys.* Mouth open.

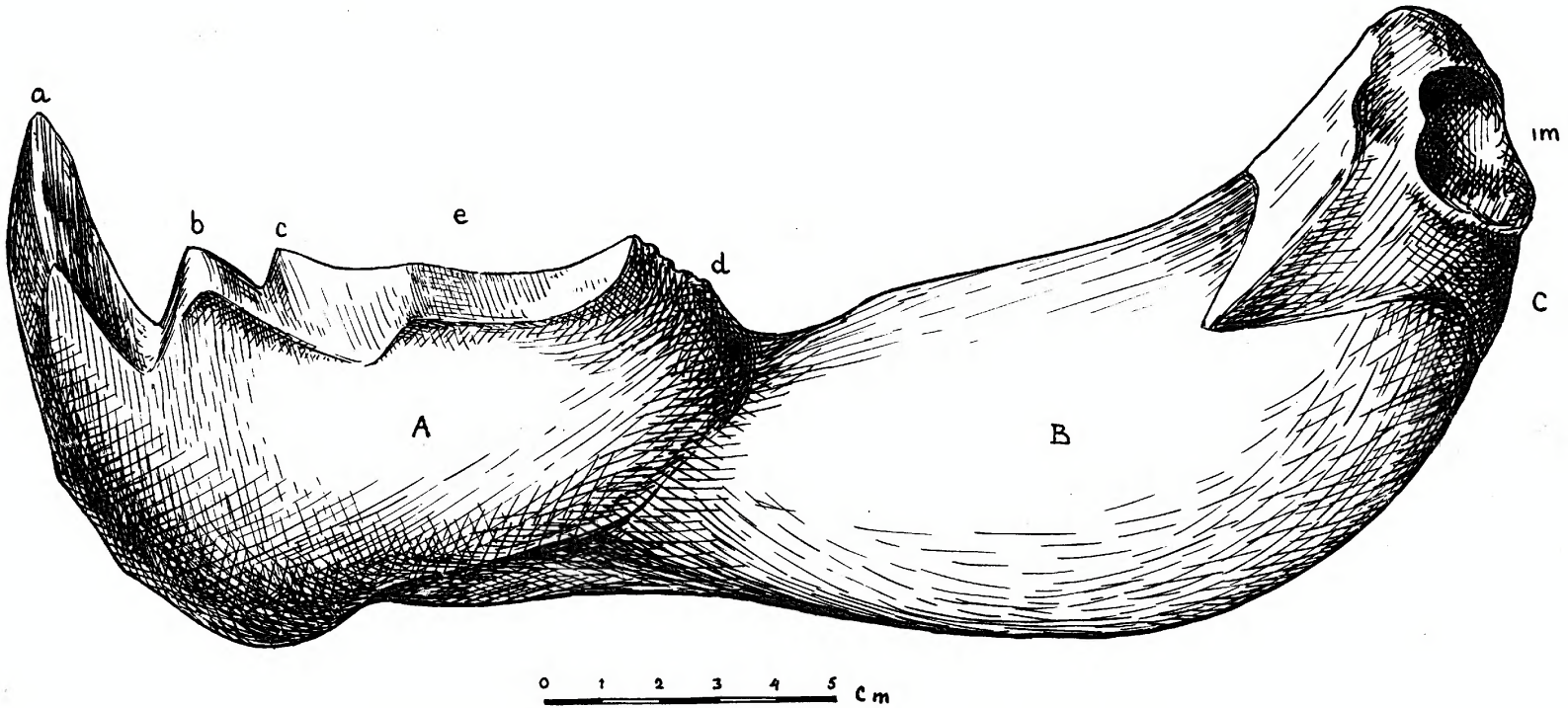

Fig. 3. Infero-gnathal and postero-infero-gnathal (*D. intermedius* Newberry)

"clavicula" (Newberry), and the ventral and dorsal shields did not touch each other. The outlines of the postero-lateral plate were also not known before.

Movement of the "Jaws"

My investigations prove clearly that the theory regarding the jaw mechanism in Arthrodira, proposed in 1919 in America, by Adams, and in Germany by Jaekel, is correct. The joint between the lower and upper jaws was very weakly developed in the Arthrodira. On the other hand, the joint between the head and body carapace was very strong. In opening the mouth, *Dinichthys* raised the head (upper jaw) at this joint. The hind corner of the lower jaw, attached to the head roof, was thus elevated; the symphysial part moved down, and the mouth opened (Figs. 1 and 2).

This unusual mouth mechanism, never before observed in any other fossils or living animals, worked by means of four pairs of muscles. These were:

1.—Musculus levator capitis which ran from the median-basal (median-occipital) to the keel on the median-dorsal. These muscles lifted the head roof. (Figs. 1 and 2, I).

2.—Musculus depressor capitis, running from the impression on the under side of the head roof (between EB and M) obliquely downward to the keel on the under side of the antero-lateral. These muscles moved the head roof downward (Figs. 1 and 2, II).

3.—Musculus levator gnathalis which was attached to the lower margin of the infero-gnathal (lower jaw) on one side and to the ridge on the lower margin of the suborbital on the other. These muscles moved the lower jaw upward (Figs. 1 and 2, III).

4.—Musculus depressor gnathalis attached on one end to the under side of the front part of the infero-gnathal, and probably running downward to the antero-median-ventral on the ventral shield. These moved the lower jaw downward (Figs. 1 and 2, IV).

Thus, the I and IV pairs of muscles together operated to open the mouth; the II and III, to shut it.

AMERICAN MUSEUM NOVITATES

Number 457 — Published by THE AMERICAN MUSEUM OF NATURAL HISTORY New York City — Feb. 11, 1931

56.7, 43 D

A NEW RECONSTRUCTION OF *DINICHTHYS*

BY ANATOL HEINTZ[1]

In studying the *Dinichthys* material in The American Museum of Natural History, I have found some new features in the structure of *Dinichthys*, and, with these in mind, I have made a new reconstruction of this form. A larger paper on this subject is ready for publication in the 'Bashford Dean Memorial Volume.' Here I shall attempt only a short description of this new reconstruction.

HEAD SHIELD

In the head shield I discovered four new plates never before described in detail. These are:

1.—A small triangular plate, the postmarginal (PM of Fig. 1), placed behind the marginal and forming the extreme hind corner of the head roof. (This is known in *Phlyctænaspis* and *Heterosteus* as "Angulare").

2.—A small oblong plate, the postnasal, in front of the suborbital. This touches the preorbital and the rostral, and defines the nasal opening. A sensory canal on its surface connects the canals of the preorbital with those on the suborbital. (This plate is well known in *Coccosteus*.)

3.—A relatively large triangular plate behind the suborbital, the post-suborbital (PSO of Fig. 1). This fills the space between the suborbital and the extreme hind corner of the head. The "lower jaw" was attached to this plate by aid of

4.—a small triangular plate called the postero-infero-gnathal (Fig. 3*c*). (Mentioned by Adams in 1919.)

The head shield was strongly curved. The right and left antero-supero-gnathal were placed close together. The "lower jaw," in all probability, was connected in symphysis, by aid of cartilage or by an unknown bone plate.

BODY CARAPACE

This reconstruction shows two new plates of the body carapace, well known from other Arthrodira. These are the intero-lateral and the spinal. They serve to connect the dorsal and ventral shields. In the older reconstructions these two plates were regarded as a part of the

[1]Palæontological Museum, Oslo.